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United States Supreme Court

OCTOBER TERM 1956

No. 367

HARRIS D. HINELINE,
Petitioner,
against
THE UNITED STATES,
Respondent.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CLAIMS

JOHN PRICE WETHERILL,
HOLCOMB, WETHERILL & BRISEBOIS,
Attorneys for Petitioner.

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To the Honorable Chief Justice and the Associate Justice of the Supreme Court of the United States:

Your petitioner, Harris D. Hineline, by his attorney John Price Wetherill, Esq. respectfully prays that a Writ of Certiorari issue from this Honorable Supreme Court, directed to the United States Court of Claims, for a review of the judgment in *Hineline* v. *United States* entered by that Court on March 6, 1956 (Court of Claims No. 49418) reported in Court of Claims (138 Fed. Second 866).

(A petition for a rehearing was denied on June 6, 1956.)

A copy of the Opinion below is attached hereto.

A certified copy of the record in the Court below is also provided, as required by Rule 21.

The statutory provision believed to confer jurisdiction of this action on the Honorable Supreme Court is found in Title 28 Section 1255 of the Revised Statutes of the United States.

Rule 19 (b) is also cited since it is believed that the Court of Claims has "so far departed from the accepted and usual course of judicial proceedings, * * * as to call for the exercise of this Court's power of supervision."

Summary of the Matter Involved

Your petitioner, on September 23, 1929, filed an application for patent on a series of vacuum tube meters including a vacuum tube distance measuring device, shown as a vacuum tube airplane altimeter. This application was duly prosecuted through a continuation application, and a divisional application to the issuance of a patent No. 2,189,582 on February 6, 1940 and a second divisional patent on January 2, 1945, as No. 2,366,621, containing claims to a radio distance measuring device. In the course of this prosecution, the Patent Office accorded to petitioner the benefit, for this application, of the date of the first filed application; this being September 23rd, 1929. The intense secrecy in which radar was held did not permit your petitioner to ascertain the details of radar until into the summer of 1949 and then a Bill of Complaint was filed in the United States Court of Claims on December 28, 1949 charging infringement by the government, in the use of radar equipment, of United States Patent No. 2,366,621.

Testimony was taken in this suit on about October 12, 1954.

In the meantime plaintiff had secured from the Department of Justice two government instruction folders which

disclosed in full detail the construction, operation, servicing and maintenance of two models of radar devices; these being instruction book TM 11-1527 dealing with the government radar unit identified as SCR-545-A, and instruction book AN 16-40 SCR-718-3 giving similar instruction for radar set SCR-718-A, etc. At the beginning of the taking of testimony it was stipulated (page 31 of the record) between counsel for defendant and counsel for plaintiff that these folders disclosed equipment made for and used by the armed services of the United States. Pursuant to this stipulation testimony was taken, relying upon the stipulated disclosures.

As noted on the first page of the Opinion of the Court of Claims, claim 1 of the patent in suit pointed out as the invention:

> "Claim 1—
>
> A measuring instrument comprising a radio transmitting system having an amplitude modulating member, a radio receiving system having a modulation detector and
>
> means connected to said modulating member and said modulation detector for comparing the phase relationships between the modulations of the radiated wave and the received wave from the transmitting system after reflection from a remote surface."

In the stipulated folder TM-11-1527 there is presented a "Figure 10" which is transcribed in the attached Opinion of the Court as an insert between pages 14 and 15 of the Opinion. This insert is a "Simplified Block Diagram" showing the various components of the stipulated radar device. The block at the extreme left is identified as a "transmitter system" which "generates high power radar frequency pulses" and is provided with a "rotary spark gap modulator". Item 2 of Claim 1 is "an ampli-

tude modulating member" and the left hand block on the insert shows a "rotary spark gap modulator". The function of both modulators is to produce groupings or trains of radio waves at a predetermined train frequency.

Yet the Honorable Court of Claims, in their Opinion on page 5, the second full paragraph, said,

> "Plaintiff seeks to take advantage of the use of the word 'modulator' on a block diagram defendant prepared describing its apparatus SCR-545-A. In describing the 'transmitter system' this diagram speaks of a 'rotary spark gap modulator.' We think the use of the word 'modulator' was a misnomer. Instead of a modulator, this was a rotary spark gap timing unit. It was an apparatus to control the duration of and the time interval between the transmission of the radio wave pulse from the antenna. Defendant's apparatus employed no modulating wave, which was the basis of plaintiff's invention."

That is, in spite of the stipulation, and the identical functions of the "modulator" in both plaintiff's device and defendant's device, the Honorable Court of Claims, by a sophistication of words and a specific disregard of the stipulation, held that defendant's device did not infringe the claims of plaintiff's patent.

Furthermore, the second of these stipulated instruction books, AN 16-40 SCR-718-3, shows a structure which is almost a Chinese copy of the device disclosed in plaintiff's patent, there being separate antennae under the wings for sending and receiving, there being a vacuum tube modulator strictly according to plaintiff's disclosure, there being the usual radio transmitting system, radio receiving system, and modulation detector (with the addition of means for shortening and squaring up the pulses transmitted); and there being in addition a vacuum tube

synchronoscope strictly as disclosed in plaintiff's patent for measuring the altitude of the airplane upon which the device is mounted.

In the prosecution of the application upon which the patent in suit issued, references were cited and the claims were limited to the modulation device to avoid those references. The defendant has seized upon a casual remark made in this connection and has alleged that there is no phase relationship used in plaintiff's device, but only a measuring of time. Plaintiff presented and defendant accepted a quotation from Webster's Dictionary showing the accepted usage in regard to phase and time, which, as set out in the record on pages 38, 38a and 39, is universally accepted by technicians. Nonetheless, the Court found for defendant and in support thereof entered in the Opinion a chart on page 6 which was not considered on testimony, was entered without the knowledge of either plaintiff or defendant, is unsupported by testimony and is incorrect.

The record shows that no one had successfully employed either phase relationships or time as a measure of distance from a given point prior to your petitioner's filing date of September 23, 1929.

The record further shows that the device of your petitioner's patent and the devices used by the armed services accomplish the same result by the use of similar components serving similar functions, although the government device has had added to it many auxiliary components to serve other purposes.

That is, both petitioner's device and defendant's device use radio frequency generators; both devices contain modulators to yield trains of radio frequency waves; both devices transmit the trains of waves toward a reflecting surface; both devices receive the reflected waves and de-

modulate them. Both devices make a comparison between the radiated and received waves and use that comparison as a measure of the distance. Your petitioner chose to word that comparison as being made in terms of a phase relationship, defendant in his book shows a "synchronizing lead wire"; but synchronism can occur only in terms of phase relationship between two cyclically recurring values.

The record further shows that your petitioner made every effort to teach those skilled in the art how to use his invention, long before the issuance of his patent, thereby serving to the best of his ability the needs of the armed forces.

In support of this petition, your petitioner respectfully complains to this Honorable Court that the Court of Claims has handed down a decision in his case, which is "so obviously and injuriously erroneous, 'as to call for an exercise of this Court's power of supervision.' This is * * * one of the considerations within * * * (the) rule governing review of certiorari" as pointed out in the holding made by this Honorable Court in *Gibson* v. *Lockheed*, 76 Supreme Ct. 366.

Your petitioner further complains that, a stipulation having been entered in the record in this case, setting forth agreed-upon structural items which are alleged to infringe the claims of the above patent, the Court of Claims has defied, disregarded and denied the force of this stipulation by asserting that structural elements specifically set forth by the stipulation are lacking and that therefore the structure does not infringe the patent; thereby denying to your petitioner compensation for the making of an important invention which he would have received if this and other items in the trial of this case had been properly conducted.

The questions presented to this Honorable Court are:

1. Is a stipulation binding upon the Court as well as upon the parties stipulating?

2. When it has been stipulated between plaintiff and defendant that certain books disclose apparatus made for and used by the defendant, in which books the same word "modulator" is used as descriptive of the structure in the same sense as is used in plaintiff's claims: may the Court deny the stipulated equivalency and hold that the use of the word is a "misnomer"?

3. When the record shows that plaintiff's device and defendant's device perform the same function by similar instrumentalities to obtain the same result and describe those instrumentalities by the same words, may the Court hold to the contrary: that they are not the same, do not function the same and do not infringe the claims in suit?

4. Whether a word definition taken from a standard dictionary, agreed upon by plaintiff and defendant and inserted in the record may be disregarded, and denied force and effect by the Court.

5. Whether the Court may enter in a holding a chart, diagram or drawing and base an opinion thereon, when this chart and its subject matter has not been presented in the record, and is not supported by testimony.

6. Whether, when the Patent Office has allotted to an applicant a specific date as the effective date of his application, as an executive matter in accordance with the settled rules and the statute, the Court may deny to applicant the benefit of that date and restrict him to the filing date of his divisional application.

Specification of Errors

If the Writ of Certiorari is issued your petitioner will urge that the Court of Claims erred:

1. In holding that the radar devices shown in the stipulated folders did not infringe your petitioner's claims in patent No. 2,366,621.

2. In disregarding the stipulation between defendant and plaintiff presenting the structures made for and used by the armed services of the United States Government.

3. That the Court of Claims erred in denying the interrelationship of time and phase.

4. That the Court of Claims erred in accepting the findings of law and fact submitted by the Commissioner.

5. That the Court of Claims erred in denying to your petitioner the benefit of his original filing date of his parent application, to his divisional application.

Argument

It is respectfully submitted to this Honorable Court that it has been understood by practitioners of law that a stipulation was an agreement between parties which was binding upon both parties, and would be so regarded by the Court. Oddly enough, however, your petitioner has been able to find only one recent Opinion in which a stipulation was discussed and its relationship to the Court's holding presented; this being a decision by the United States Court of Appeals, Second Circuit, in *Artype* v. *Zappulla* (228 Fed. 2nd 695), in which defendant had stipulated that a trademark was a valid mark and was thereafter denied the privilege of insisting that it was not a valid mark.

It is believed that the present situation in which the Court of Claims has effectively denied the efficacy of the stipulation entered into between plaintiff and defendant as shown on pages 2 and 31 of the record requires a ruling by this Supreme Court whether a stipulation, as entered into by plaintiff and defendant is binding upon the Court as well as upon the parties. It is pointed out to this Honorable Court that if the defendant had been unwilling to stipulate these books into the record, they need only have said so and left defendant to his proofs. It would have delayed the taking of testimony somewhat but not seriously. Yet defendant, recognizing that these instruction books could easily be proved, was willing to stipulate, and having so stipulated it is believed that this Honorable Court should consider the matter and rule that the stipulation was binding *in toto* upon both plaintiff, defendant and the Court, for the subject matter shown therein. It is believed that no Court should be allowed to play fast and loose with a stipulation entered into between the litigants, especially when that stipulation presents the facts in a much more clean-cut, accurate manner than could be done by testimony.

Furthermore, it is urged that a ruling by this Honorable Court, as to the value and persuasive force of a dictionary definition is called for. In the present situation, plaintiff's claims were drawn to the inclusion of a "modulating member" which in some claims was specified as an "amplitude modulating member". And the final distance determination was specified as obtained by "comparing phase relationships between the modulations of the radiated wave and the received wave". The matter of phase comparison was reviewed *in extenso* in the testimony and the defendant insisted that he used only time measurements. In consequence, plaintiff introduced a dictionary

definition taken from a Standard Webster's Dictionary, as shown on pages 38, 38a and 39 of the record in which it was pointed out that time and phase are inseparably interrelated. This is well shown by the common usage of the words "phases of the moon", meaning the times at which the various aspects of the moon appear. This dictionary definition was checked by defendant's counsel and accepted by him. However, the Court of Claims disregarded this dictionary definition and held that defendant's apparatus measured only time and not phase relationship.

Your petitioner has been unable to find any ruling in which the force of an *accepted* dictionary definition was ruled upon and it is believed that this Honorable Court might well rule upon the matter.

In the handling of this action before the Court of Claims, plaintiff undertook to follow the holding entered by this Honorable Supreme Court in *Machine Company* v. *Murphy*, reported in 97 Supreme Court 120, in which this Honorable Court said:

> "Authorities concur that the substantial equivalent of a thing, in the sense of the patent law, is the same as the thing itself; so that if two devices do the same work in substantially the same way and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape. Curtis, Patents (4th ed.) sect. 310".

And if certiorari is granted, your petitioner will urge that the situation of his suit come squarely within the ruling made in this holding by the Honorable Supreme Court, since plaintiff's apparatus and defendant's apparatus contain exactly the same instrumentalities identified by the same names and performing the same functions. It is believed that this Honorable Court may properly

rule upon the force of this decision as applied to the Court of Claims.

In addition, your petitioner will, if certiorari is granted, point out to this Honorable Court that the armed services of these United States have urged the development of new and effective armaments by every possible means and every possible inventor, yet the denial of applicant's suit before the Court of Claims and the denial of appropriate compensation to plaintiff after his efforts to teach those skilled in the art imposes a very severe burden upon the governmental services in their efforts towards the obtaining of new inventions for national defence. In other words, your petitioner will urge that if this decision by the Court of Claims is allowed to stand, it becomes a specific notice to all inventors of armament devices that they would expect nothing but the harshest treatment from the government for any inventions which they may make.

WHEREFORE, your petitioner respectfully prays that this Honorable Supreme Court issue a Writ of Certiorari directed to the Court of Claims, and review and correct the obvious errors made therein with respect to your petitioner's suit in that Court, on Patent No. 2,366,621.

Respectfully submitted,

JOHN PRICE WETHERILL, Esq.,
HOLCOMB, WETHERILL & BRISEBOIS,
Attorneys for Petitioner.

In the United States Court of Claims

No. 49418

(Decided March 6, 1956)

HARRIS D. HINELINE v. THE UNITED STATES

Mr. John Price Wetherill for plaintiff.

Mr. T. Hayward Brown, with whom was *Mr. Assistant Attorney General Warren E. Burger*, for defendant.

OPINION

WHITAKER, *Judge*, delivered the opinion of the court:

Plaintiff sues for compensation for the infringement of its patent Number 2,366,621, issued January 2, 1945, on an apparatus for measuring altitude. The first question presented is whether the defendant's apparatus infringes plaintiff's; in other words, whether it employs the elements recited in certain patent claims defining plaintiff's invention.

We agree with the Commissioner that it does not.

Plaintiff says that defendant has infringed claims 1, 3 and 4 of its patent. It places but scant reliance on the other claims and these do not need to be discussed, but they are dealt with in the findings of fact. Claims 1, 3 and 4 read:

Claim 1—

A measuring instrument comprising
a radio transmitting system, having
an amplitude modulating member,
a radio receiving system having
a modulation detector and
means connected to said modulating member and said modulation detector for comparing the phase relationships between the modulations of the radiated wave and the received wave from the transmitting system after reflection from a remote surface.

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Claim 3—

A measuring instrument comprising
a radio transmitting system,
a directive antennae structure connected thereto,
a modulator connected thereto,
a radio receiving system and
an indicating device connected to and receiving energy from both modulator and receiver and indicating distance in terms of energy phase characteristic comparisons of the modulation envelopes.

Claim 4—

A measuring instrument comprising
a radio transmitting system,
a directive antennae structure connected thereto,
a modulator connected thereto comprising
means for producing a wave length equal to approximately four times the maximum distance to be measured,
a radio receiving system and
an indicating device connected to and receiving energy from both modulator and receiver and indicating distance in terms of comparisons of the phase relationships of the modulation envelope.

It will be noted that the distinctive feature of each of these claims is the use of an amplitude modulating member or a modulator. A modulator is an electrical circuit which produces an electromagnetic wave which can be combined with and added to the carrier wave emitted by a radio transmitter. The addition of the second wave to the carrier wave results in a combined or modulated wave which is sent out continuously from the transmitter.

In this modulated wave that is transmitted, there are certain regularly recurring peaks or points. After these peaks or points, the amplitude of the transmitted modulated wave subsides, but 360 degrees later the peak occurs again.

When this modulated wave is reflected by the ground, a receiving set receives the reflected waves, which contain recurring peaks like those of the modulated wave transmitted.

Plaintiff measures the altitude of an aircraft above the earth by measuring the phase difference or phase relationship between the peaks or points of the emitted modulated wave and the peaks or points of the reflected modulated wave. By this it is meant that from the difference in the

number of degrees between the transmission of the peak modulated wave and the receipt of the reflected wave the altitude can be determined. For example, if the peak wave is transmitted at 0 degrees and has travelled some degrees less than 360° along the full cycle of 360° before the peak of the reflected wave is received, the number of degrees travelled shows the altitude.

In plaintiff's apparatus electrical energy is being constantly transmitted and, hence, plaintiff's apparatus is wholly dependent on the recurrence of these peaks, occasioned by the combination of the radio wave and the modulating wave.

Plaintiff says its patent was infringed by defendant's radar unit SCR-545-A. However, defendant's apparatus employs no modulating wave, and the transmission of energy from the transmitter is not continuous.

Defendant's apparatus emits a pulse of energy from its antenna for a brief instant of time and then waits for a relatively long period for this pulse to "bounce back" before it transmits another pulse.

The distance of the object is measured by the time it takes for the electrical pulse transmitted to "bounce back," measured, of course, in millionths of a second, since the waves travel about 186,000 miles per second.

Plaintiff's patent is not based on the idea of measuring distance by the lapse of time between the transmission of an electrical impulse and its return. It is based on the use of the modulating wave in conjunction with the radio wave, and by determining the difference in degrees between the transmitted wave and the reflected wave.

As originally drawn, plaintiff's claims 1, 3, and 4 did not rely on phase comparison as a means of determining altitude and the claims were rejected because lacking invention. Plaintiff then amended his claims by saying that the radio transmitting system had "an amplitude modulating member" and a "modulation detector for comparing the phase relationships between the modulations of the radiated wave and the received wave * * *."

At the same time plaintiff represented that by the amendments "* * * applicant has herewith *limited all of the claims to the modulation system* and to the determination of the phase relationship between energy received after reflection

from the ground, and energy received directly from the modulator member." [Italics supplied.] Plaintiff further represented that "This phase comparison is the *essence* of the applicant's invention and permits of the measurement of the altitude without counting wave lengths and *without time measurements*, and with entire freedom from errors due to shiftings in energy or characteristics upon reflection at the ground." [Italics supplied.]

After these amendments and upon the basis of these representations, the patent was granted.

Defendant's apparatus is not based on this principle. It does not use a modulating wave and the transmission of electrical energy from the transmitter is not continuous, but in bursts or pulses.

The SCR–545–A radar unit manual states:

> Every workable radar system * * * makes use of pulse transmission. The radar transmitter must send out r-f [radio frequency] energy, not as continuously as the ordinary broadcasting transmitter does, but in short bursts. * * * Part of this energy is picked up in the form of echoes by the radar receiver, after the energy has been reflected by one or more targets. If the energy were transmitted continuously, there would be many reflections; however, the reflected energy would be very weak as compared with the transmitted energy and, thus, the echoes would be drowned out and could not be detected in the presence of the main radiations. Consequently, pulse transmission must be used, and enough time must elapse between successive pulses to allow for the reception of the echoes. * * * Usually, radar pulses have durations ranging from about 1 to 40 or 50 microseconds (millionths of a second). They are separated by much longer time intervals, usually by several hundred microseconds. These pulses recur at rates determined by their separation time. The length or duration of a pulse is commonly called *pulse width*. The number of pulses per second is called recurrence frequency.

It also states:

> * * * The transmitter system, triggered by the timing unit which in this case is the rotary spark gap contained in the transmitter system, generates r-f pulses. * * *

> The timing unit (spark gap) is the master timer. It supplies and coordinates the trigger pulses and sweep voltages. * * * To produce these pulses, pulse-forming lines for both systems are charged to a high potential from the high-voltage rectifier through the charging inductor and diode, and then discharged through the transmitter tubes by the action of the rotary spark gap. The spark gap acts as a timing unit for the entire system. Timing impulses are taken from resistors in series with the discharging circuit, and applied to the ranging system and target indicators.

A graphic presentation of the difference between the principles of plaintiff's claimed invention and of defendant's system is shown in the diagram reproduced at the end of this opinion (page 6).

Plaintiff seeks to take advantage of the use of the word "modulator" on a block diagram defendant prepared describing its apparatus SCR-545-A. In describing the "transmitter system" this diagram speaks of a "rotary spark gap modulator." We think the use of the word "modulator" was a misnomer. Instead of a modulator, this was a rotary spark gap timing unit. It was an apparatus to control the duration of and the time interval between the transmission of the radio wave pulse from the antenna. Defendant's apparatus employed no modulating wave, which was the basis of plaintiff's invention.

We are, therefore, of opinion that defendant's radar unit SCR-545-A did not infringe plaintiff's patent. Nor do we think that defendant's apparatus SCR-718 infringes plaintiff's patent, for substantially the same reason as stated in relation to defendant's apparatus SCR-545; all as more particularly set out in the findings.

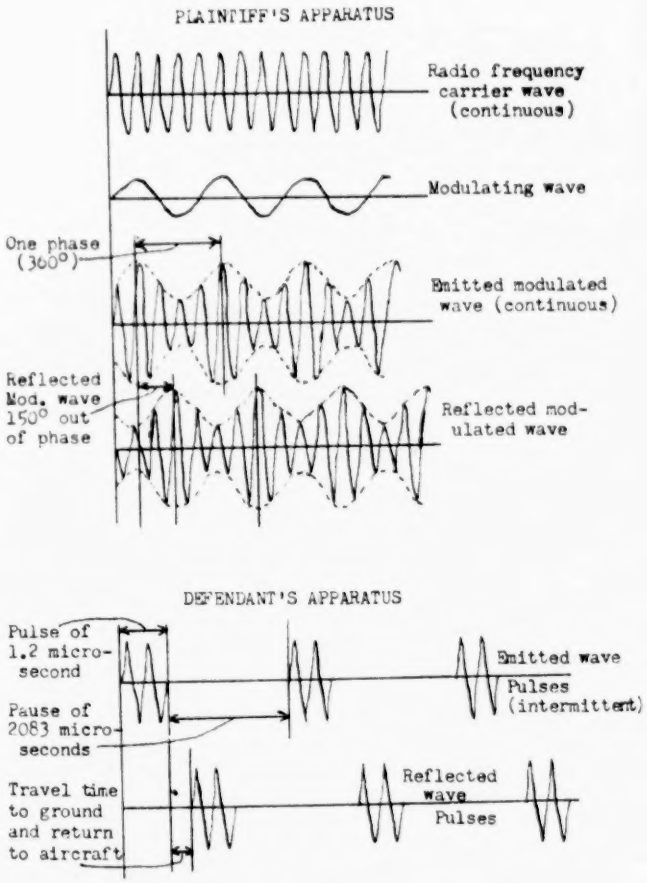
The Commissioner made findings on the question of the validity of plaintiff's patent and discussed this question in his memorandum, concluding that the patent was invalid because anticipated by the prior art. However, we do not think it is necessary to discuss this question or to make findings thereon, since we think there is no basis for questioning the correctness of our conclusion that defendant's apparatuses do not infringe plaintiff's patent. Since there

has been no infringement, there can be no recovery, whether or not plaintiff's patent is valid.

The plaintiff's petition will be dismissed.

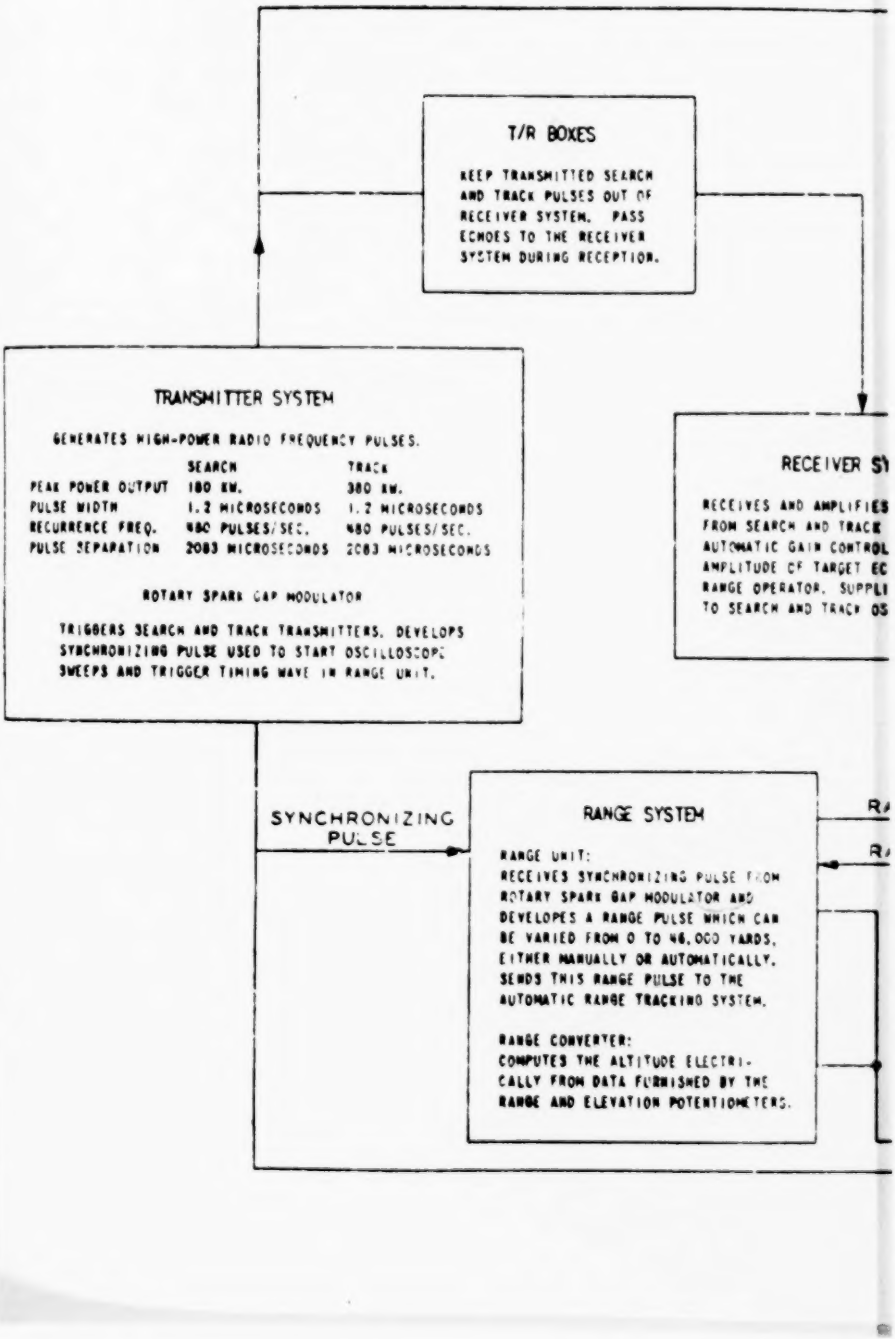
It is so ordered.

LARAMORE, *Judge;* MADDEN, *Judge;* LITTLETON, *Judge;* and JONES, *Chief Judge*, concur.



Waves travel 186,000 miles per second, 982 feet/microsecond.

A total travel time of 30 microsec. = 14,730 feet altitude.


T/R BOXES
KEEP TRANSMITTED SEARCH AND TRACK PULSES OUT OF RECEIVER SYSTEM. PASS ECHOES TO THE RECEIVER SYSTEM DURING RECEPTION.
TRANSMITTER SYSTEM
GENERATES HIGH-POWER RADIO FREQUENCY PULSES.
SEARCH
TRACK
PEAK POWER OUTPUT 180 KW. 380 KW.
PULSE WIDTH 1.2 MICROSECONDS 1.2 MICROSECONDS
RECURRENCE FREQ. 480 PULSES/SEC. 480 PULSES/SEC.
PULSE SEPARATION 2083 MICROSECONDS 2083 MICROSECONDS
ROTARY SPARK GAP MODULATOR
TRIGGERS SEARCH AND TRACK TRANSMITTERS. DEVELOPS SYNCHRONIZING PULSE USED TO START OSCILLOSCOPE SWEEPS AND TRIGGER TIMING WAVE IN RANGE UNIT.
RECEIVER SY
RECEIVES AND AMPLIFIES
FROM SEARCH AND TRACK
AUTOMATIC GAIN CONTROL
AMPLITUDE OF TARGET EC
RANGE OPERATOR. SUPPLI
TO SEARCH AND TRACK OS
SYNCHRONIZING PULSE
RANGE SYSTEM
RANGE UNIT:
RECEIVES SYNCHRONIZING PULSE FROM ROTARY SPARK GAP MODULATOR AND DEVELOPES A RANGE PULSE WHICH CAN BE VARIED FROM 0 TO 46,000 YARDS, EITHER MANUALLY OR AUTOMATICALLY. SENDS THIS RANGE PULSE TO THE AUTOMATIC RANGE TRACKING SYSTEM.
RANGE CONVERTER:
COMPUTES THE ALTITUDE ELECTRICALLY FROM DATA FURNISHED BY THE RANGE AND ELEVATION POTENTIOMETERS.
R
R

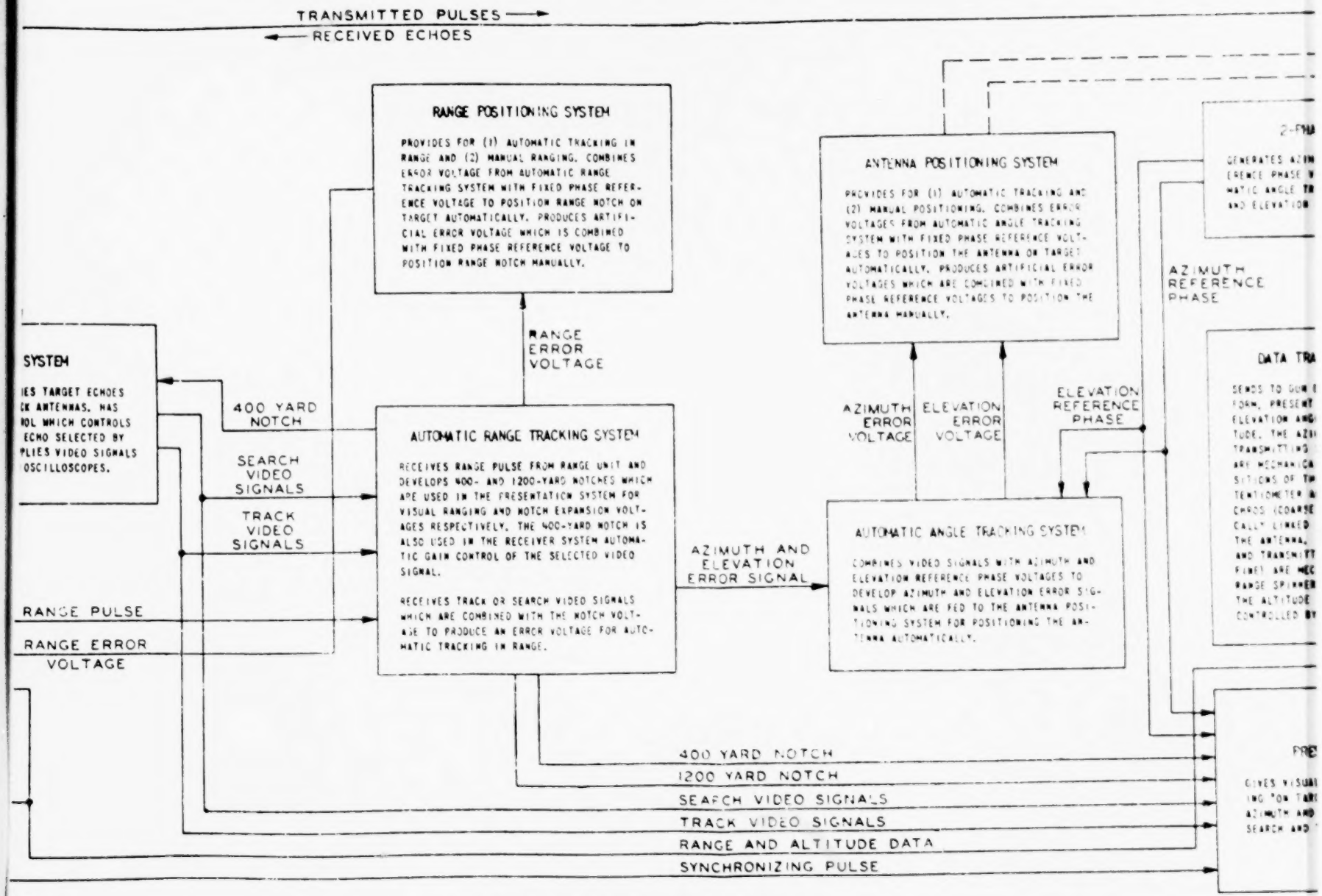
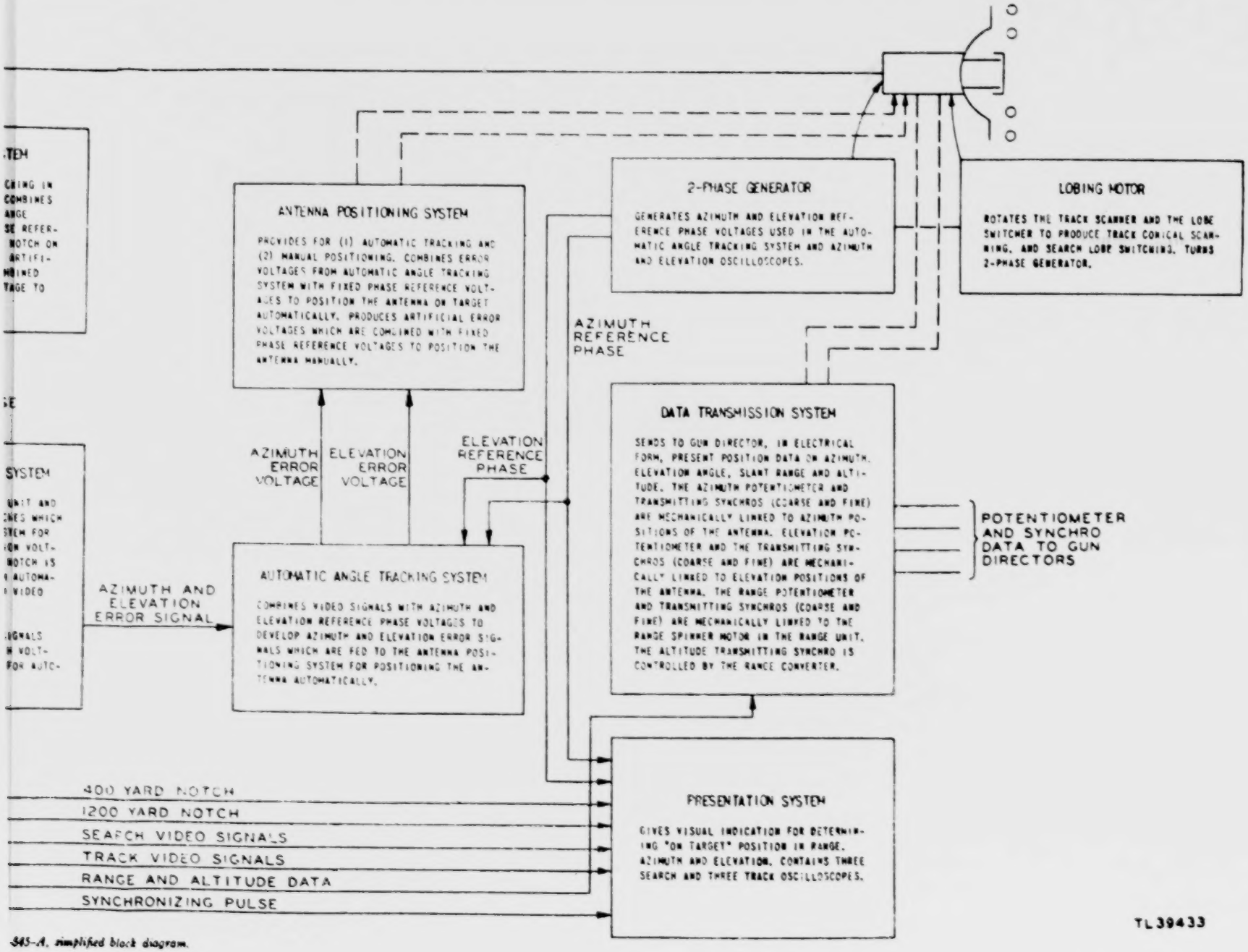


Figure 10 Radio Set SCR-545-A, simplified block diagram.



345-A, simplified block diagram.

FINDINGS OF FACT

The court, having considered the evidence, the report of Commissioner Donald E. Lane, and the briefs and argument of counsel, makes findings of fact as follows:

1. The subject matter here involved concerns systems for indicating the height of an aircraft above the earth by use of electronic altimeter apparatus carried by the aircraft. The altimeter apparatus includes means for transmitting radio waves from the aircraft, for receiving back the reflection of said waves from the earth, and for indicating a relationship between transmitted waves and received reflected waves. Radio waves travel through space at a speed of the order of 186,000 miles per second. [The elapsed time between a particular transmission from an aircraft and the reception of its reflection from the earth is a factor in determining the actual height of the aircraft above the earth.]

2. The determination of the height of aircraft above the earth by means of reflected radio waves is a relatively old art. In 1923, Löwy filed an application for letters patent showing apparatus for ascertaining the height of an aircraft flying above the ground by intermittently transmitting sets of electric waves from the aircraft, and by then receiving intermittently the reflected electric waves. Adjustment of the duration of the transmissions so that the received reflections produce a current provides a time factor indicative of the altitude of the aircraft. The Löwy patent, 1,585,591, was granted May 18, 1926. In 1924, Jenkins filed an application for letters patent on an aircraft altimeter including apparatus for transmitting a selected length radio wave downwards from the aircraft and for indicating when the reflected wave from the ground is out of phase with the transmitted wave. Jenkins disclosed that by changing the wave length, the apparatus could be calibrated to indicate the altitude of the

aircraft. The Jenkins patent, 1,756,462, was granted April 29, 1930. In 1928, Bentley filed an application for letters patent on an airplane altitude indicating system based on determining the beat frequency produced by a high radio frequency electromagnetic wave radiated from the airplane and the reflection of said wave from the earth. Bentley indicated that the beat frequency current may be calibrated to indicate airplane altitude. The Bentley patent, 2,011,392, was granted August 13, 1935. Certain of the above patents and others will be mentioned in more detail hereinafter.

PATENT IN SUIT

3. The patent in suit, Hineline patent 2,366,621, resulted from protracted proceedings before the Patent Office over a period of 15 years upon three Hineline applications for letters patent. The first of these applications, S. N. 394,596, was filed September 23, 1929, was held abandoned as of December 24, 1935. The second application, S. N. 631,026, was filed August 30, 1932, and patent 2,189,582 issued thereon February 6, 1940. The third application, S. N. 306,339, was filed November 27, 1939, and the patent in suit, patent 2,366,621, issued thereon January 2, 1945. A chronological review of the proceeding on said three patent applications is necessary to ascertain the effective date and scope of the subject matter recited in the patent claims here involved.

4. The plaintiff's first application for patent, S. N. 394,596, filed in 1929, related to amplifying electrical measuring apparatus. In said application there were 20 claims, only one of which, claim 15, related specifically to altimeter apparatus. In his first action January 30, 1930, the Patent Office examiner required division. After two rejections by the Patent Office, the plaintiff in August 1931 requested action on claims other than claim 15. After four more actions by the Patent Office on other claims, the plaintiff was advised by the Patent Office on June 24, 1935, that claim 15 should be canceled promptly. Plaintiff did not direct the cancellation of claim 15 in responding to said action. On December 30, 1935, the plaintiff was advised by the Patent Office that this application was held abandoned because of his failure to fully respond to Patent Office action of June

24, 1935. Plaintiff's request for reconsideration was considered, and the Patent Office reported that no reason appeared for withdrawing the 1935 holding of abandonment. Plaintiff then filed a verified Petition to Revive directed to the Commissioner of Patents and asked that the holding of abandonment be withdrawn or that the abandonment be held unavoidable. On the same date, September 28, 1937, plaintiff filed an amendment directing the cancellation of altimeter claim 15 from his abandoned application. The Petition to Revive was denied by the Assistant Commissioner of Patents on January 13, 1938. The plaintiff thereafter requested reconsideration, and his Petition to Revive was again denied, and after another request for reconsideration, the Assistant Commissioner of Patents denied the Petition to Revive for the third time on May 18, 1938. The plaintiff's application, S. N. 394,596, was held to be abandoned as of December 24, 1935, and altimeter claim 15 thereof was specifically canceled by the plaintiff on September 28, 1937.

5. The plaintiff's second application for patent, S. N. 631,026, filed in 1932, was directed to vacuum tube amplifier systems and to a combination of an amplifier with a photoelectric cell. No mention was made in this specification, drawings, or claims, when filed, of any apparatus for measuring the altitude of aircraft. After five rejections, this application was allowed on August 19, 1936, with two claims, neither of which related to altimeter apparatus. The plaintiff forfeited this application by failing to pay the required final fee. One year later, on August 18, 1937, the plaintiff filed a petition for renewal and added new claims not relating to altimeter apparatus. After several rejections, several additions of other new claims also not relating to altimeter apparatus, and the filing of a Petition to the Commissioner of Patents, this second application was allowed, and patent 2,189,582 subsequently issued to the plaintiff. This application and the patent issued thereon never contained any claim directed specifically to altimeter apparatus, and the patent is not in suit here.

6. The plaintiff's third application for patent, S. N. 306,339, which resulted in patent 2,366,621, here in suit, was filed in the Patent Office on November 27, 1939. This ap-

plication stated that it related to vacuum tube amplifier systems and to the combination of an amplifier with a photoelectric cell. The claims filed were directed to measuring instruments, aerial altimeter structures, and to prospecting systems. After three rejections by the Patent Office, this application also became abandoned, as of December 26, 1941, by plaintiff's failure to file a timely response. Plaintiff's Petition to Revive this application was allowed, and after three more rejections, the plaintiff filed another petition to the Commissioner of Patents requesting withdrawal of a requirement to remake some of the drawings. The petition was considered and refused. After further changes in the drawings and specifications at the direction of the plaintiff, the patent in suit finally issued on January 2, 1945.

7. The prosecution of the plaintiff's three patent applications was extended over an unusual length of time. In each case, the plaintiff delayed his response to the Patent Office rejections to nearly the last permissible day. The prosecution was extended by the plaintiff by repeated requests for reconsideration. The first application was abandoned by plaintiff's incomplete response, the second application was forfeited by plaintiff's nonpayment of required fee, and the third application was abandoned by no response. Although the plaintiff presented a single claim directed to altimeter apparatus, claim 15 in S. N. 394,596, from September 23, 1929, to December 24, 1935, he did not diligently prosecute said claim during said period. The plaintiff did not file a divisional application presenting claim 15 during the 5-year period between the Patent Office requirement for division and his abandonment of the first application.

8. Plaintiff's active prosecution of patent application claims directed to altimeter devices effectively began only when he filed the third application on November 27, 1939, which application resulted in the patent in suit. The plaintiff's oath accompanying his third application was executed May 6, 1939 and again on November 25, 1939, and averred that plaintiff's invention had not been in use, on sale, or patented or described in a printed publication more than two years prior thereto. Said oath made no reference or claim to the benefit of the respective filing dates of plaintiff's earlier filed applications.

9. The plaintiff was not diligently prosecuting any claims to altimeter devices in the period from September 28, 1937 to November 27, 1939, during which period a patent on similar altimeter devices was granted to Scharlau on May 10, 1938, and a patent was granted to Alford on February 21, 1939. The plaintiff's effective date of the alleged invention in suit is November 27, 1939, the actual filing date of the patent in suit, because of his lack of diligence prior to that date.

10. The patent in suit states that it is a division of plaintiff's second application S. N. 631,026. Said statement is incorrect, and altimeter apparatus was never claimed in S. N. 631,026, and there was never any Patent Office requirement made for plaintiff to divide subject matter out of S. N. 631,026. The patent in suit also states that S. N. 631,026 is a continuation-in-part of plaintiff's application S. N. 394,596, filed September 23, 1929. This statement by the plaintiff does not give the patent in suit an effective date of September 23, 1929. The patent in suit is actually a continuation-in-part of the plaintiff's second application, S. N. 631,026, and it is entitled to the filing date of said second application, S. N. 631,026, namely, August 30, 1932, only for such of the subject matter that was actually common to both applications and actually contained in S. N. 631,026 on August 30, 1932. As stated heretofore, S. N. 631,026 never contained claims to altimeter apparatus. Such apparatus was mentioned, but not claimed, in subject matter added to the specifications in S. N. 631,026, by an amendment filed November 12, 1938, nearly three years after S. N. 394,596 became abandoned.

11. The claims in suit are claims 1, 3, 4, 5, 6, 7, 8, 9, 16 and 17 of Hineline patent 2,366,621. At the trial plaintiff specifically applied claims 1, 3 and 4 to alleged infringing structures. These claims are set out as follows:

Claim 1—

A measuring instrument comprising
a radio transmitting system, having
an amplitude modulating member,
a radio receiving system having
a modulation detector and
means connected to said modulating member and said modulation detector for comparing the phase relationships between the modulations of the radi-

ated wave and the received wave from the trans mitting system after reflection from a remote surface.

Claim 3—

A measuring instrument comprising
a radio transmitting system,
a directive antennae structure connected thereto,
a modulator connected thereto,
a radio receiving system and
an indicating device connected to and receiving energy from both modulator and receiver and indicating distance in terms of energy phase characteristic comparisons of the modulation envelopes.

Claim 4—

A measuring instrument comprising
a radio transmitting system,
a directive antennae structure connected thereto,
a modulator connected thereto comprising
means for producing a wave length equal to approximately four times the maximum distance to be measured,
a radio receiving system and
an indicating device connected to and receiving energy from both modulator and receiver and indicating distance in terms of comparisons of the phase relationships of the modulation envelope.

12. Figure 8 of the drawings of the Hineline patent in suit is reproduced herewith (page 14) for a clearer understanding of the plaintiff's alleged invention. This drawing shows a radio transmitting system including antenna 118, an amplitude modulating member in the form of triodes 117 and 121 provided with oscillation-producing circuits, a radio receiving system including antenna 122 and receiving triode 124, said system having a modulation detector including transformers 115 and 116 and triode 124, and means such as meter 6 connected to said modulating members 117 and 121 through coil 125 and meter transformers 111 and 112, and connected to said modulation detector 124 through meter transformers 115 and 116, all for comparing the phase relationship between the modulations of the radiated wave and the received wave from the transmitting system after reflection from a remote surface designated in the drawing as ground level. The alleged invention set forth in claim 3 is similar to that of

claim 1, applied above, plus a limitation that the antenna connected to the transmitting system is directive, as illustrated by the auxiliary antennae 119 of the accompanying drawing. The alleged invention set forth in claim 4 is similar to claim 3 but adds means for producing a wave length equal to approximately four times the maximum distance to be measured. The circuits associated with triode 121 are described as adapted to generate at a frequency corresponding to a wave length of four times the maximum height which it is desired to measure.

13. There are certain inaccuracies in the circuitry shown in the drawings of the Hineline patent in suit, but the faults in illustration are not such as to prevent one skilled in the art from following the teaching of the patent.

14. Modulation, as the term is used in radio, is the process whereby the frequency or amplitude of a wave is varied in accordance with a signal wave. A modulator is a device to effect the process of modulation. It may be operated by virtue of some non-linear characteristic and also by a controlled variation of some circuit quantity. This definition is found in Encyclopedia Britannica, 14th Edition, 1929, Vol. 15, on page 643.

15. Phase, as the term is used in physics, is defined as follows: In the uniform circular motion, simple harmonic motion, or in periodic changes of any magnitude varying according to a simple harmonic law (as sound vibrations, alternating electric currents, etc.), the point or stage in the period to which the rotation, oscillation, or variation has advanced, considered in its relation to a standard position or assumed instant of starting. This relation is commonly expressed in angular measure, one cycle or period being 360°. This definition is found in Webster's New International Dictionary, 2nd Edition, 1947, page 1838, and also in earlier editions.

FILE WRAPPER ESTOPPEL

16. Plaintiff's patent claims 1, 3 and 4 as originally presented to the Patent Office did not recite that it was a "phase" relationship or characteristic that was compared or indicated. In response to a rejection of the original claims as

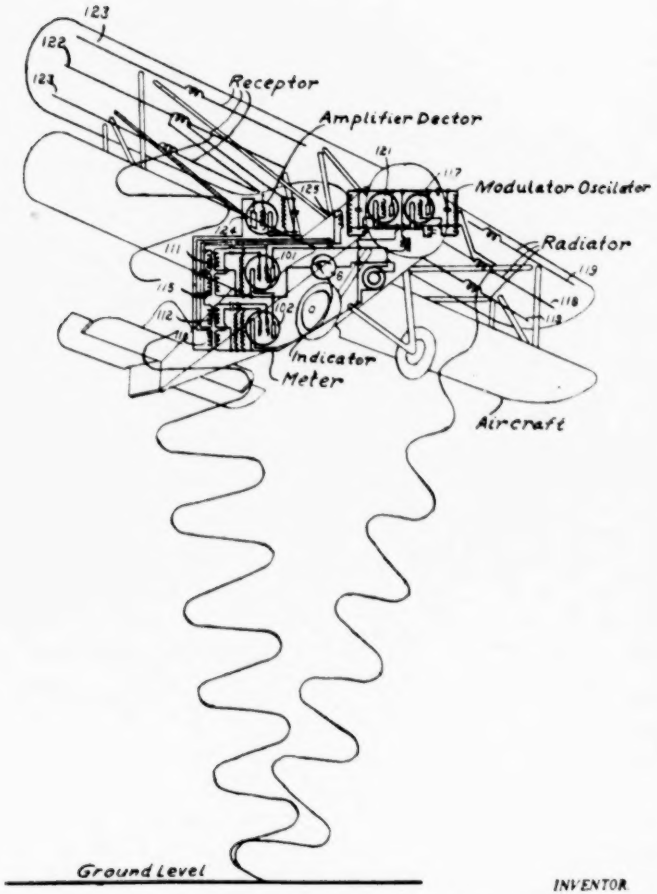


Fig 8

INVENTOR

fully met by or as lacking invention over cited patents, and in response to the Patent Office comment that—

> These claims, as drawn, fail to point out the cooperative relation of the modulation frequency as impressed on the transmitted carrier wave and as utilized in the phase comparison circuit coupled to the indicator and to the other circuits.

the plaintiff amended his claims by adding "having an amplitude modulating member" and "phase relationships of the" to claim 1. He likewise amended claim 3 by adding "phase" and "of the modulation envelopes," and amended claim 4 by adding "of the phase relationships of the modulation envelopes."

17. In limiting his claims by amendment to recite that it was a "phase" relationship or characteristic that was compared or indicated, the plaintiff stated:

> * * * applicant has herewith *limited all of the claims to the modulation system* and to the determination of the phase relationship between energy received after reflection from the ground, and energy received directly from the modulator member. [Italics supplied.]

and stated later:

> This phase comparison is the *essence* of the Applicant's invention and permits of the measurement of the altitude without counting wave lengths and *without time measurements*, and with entire freedom from errors due to shiftings in energy or characteristics upon reflection at the ground. [Italics supplied.]

18. By the statements quoted in the preceding finding, the plaintiff has expressly limited the scope of the claims in suit to altimeter systems involving a comparison of phase relationships without counting wave lengths and without time measurement.

THE ALLEGED INFRINGING STRUCTURES

19. The first accused structure relied upon by the plaintiff in attempts to prove infringement of the Hineline patent by the defendant is illustrated diagrammatically in War Department Technical Manual TM 11-1527, entitled Radio Set SCR-545-A, Service Manual, dated October 21, 1944, which is plaintiff's exhibit 3. Said radio set is primarily a mobile radar unit for locating and tracking enemy aircraft and for generating voltages representing aircraft position in terms of range, height, and elevation angle. The unit is illustrated in Figure 10 on page 11 of the exhibit. Reference is made to a folded block diagram designated Figure 10 Radio Set SCR-545-A, and bound opposite page 8 of said manual. The SCR-545-A block diagram, reproduced here-

in, shows a radio transmitter system at the left for furnishing transmitted pulses to an antenna shown at the upper right. The transmitter system is indicated as generating radio frequency pulses having a pulse width of 1.2 microseconds* recurring at the rate of 480 pulses per second, the pulses being separated by an interval of 2083 microseconds. The transmitter system utilizes a rotary spark gap mechanism to trigger the transmitters and to develop a synchronizing pulse used to develop a range pulse variable from zero to 46,000 yards. The block diagram also shows a radio receiving system connected to the same antenna through a transmitter-receiver box to receive and amplify the target echoes. The receiver system includes automatic gain control which controls the amplitude of the target echo. The receiver furnishes signals to a presentation system at the lower right which together with the synchronizing pulse provide an indication of target range.

20. The SCR-545-A radar unit manual states:

> Every workable radar system * * * makes use of pulse transmission. The radar transmitter must send our r-f [radio frequency] anergy, not as continuously as the ordinary broadcasting transmitter does, but in short bursts, * * * Part of this energy is picked up in the form of echoes by the radar receiver, after the energy has been reflected by one or more targets. If the energy were transmitted continuously, there would be many reflections; however, the reflected energy would be very weak as compared with the transmitted energy and, thus, the echoes would be drowned out and could not be detected in the presence of the main radiations. Consequently, pulse transmission must be used, and enough time must elapse between successive pulses to allow for the reception of the echoes. * * * Usually, radar pulses have durations ranging from about 1 to 40 or 50 microseconds (millionths of a second). They are separated by much longer time intervals, usually by several hundred microseconds. These pulses recur at rates determined by their separation time. The length or duration of a pulse is commonly called *pulse width*. The number of pulses per second is called recurrence frequency.

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*One microsecond is one-millionth of a second.

21. The SCR–545–A manual also states:

> * * * The transmitter system, triggered by the timing unit which in this case is the rotary spark gap contained in the transmitter system, generates r-f pulses. * * * The timing unit (spark gap) is the master timer. It supplies and coordinates the trigger pulses and sweep voltages. * * * To produce these pulses, pulse-forming lines for both systems are charged to a high potential from the high-voltage rectifier through the charging inductor and diode, and then discharged through the transmitter tubes by the action of the rotary spark gap. The spark gap acts as a timing unit for the entire system. Timing impulses are taken from resistors in series with the discharging circuit, and applied to the ranging system and target indicators.

22. The SCR–545–A manual describes the rotary spark gap as consisting of an insulated disc with eight uniformly spaced electrodes passing through the disc and projecting one each on each side, as shown in figure 30 on page 33 of the manual. The disc of the spark gap is driven by a 3600 rpm synchronous motor.

23. The SCR–545–A manual illustrates in Figure 93 on page 116 the indication of the direct pulse and the echo or reflected pulse on an oscilloscope. The distance between the direct pulse and the echo pulse represents exactly the transit time of the ultra-high-frequency waves to and from the target, and gives an exact measurement of the distance to the target.

24. Within a period of six years prior to the filing of plaintiff's petition, mobile radar units known as SCR–545–A and described in above findings 19–23, inclusive, were used by the defendant without the license or consent of the plaintiff.

25. The second accused structure relied upon by the plaintiff in attempts to prove infringement of the Hineline patent by the defendant, is illustrated in AN 16–40 SCR 718–3, a handbook of maintenance instructions for Radio Sets SCR–718–A, SCR–718–AM, SCR–718–B, and SCR–718–C, dated November 4, 1944, revised December 10, 1945, and November 14, 1951, which is plaintiff's exhibit 7. Radio Set SCR–718 is a high altitude radio altimeter for installation in aircraft to determine height above terrain. The SCR–718 altimeter

is shown diagrammatically in a block diagram designated Figure 4–1 and appearing in section IV of the handbook.

26. The SCR–718 altimeter as shown in figure 4–1 includes a radio transmitting system having a transmitting antenna, an ultra-high-frequency output device, a driver, a clipper, and a crystal-controlled timing oscillator. The SCR–718 altimeter also includes a radio receiving system having a receiving antenna, a converter and receiver oscillator, and several amplifier stages preceding a detector stage. Pulses from the receiver and from the timing oscillator are fed to a cathode ray presentation tube through control circuits. The reference pulse and the reflected pulse produce corresponding lobes on the face of the cathode ray tube as illustrated in figure 3–1 of section III of the handbook. The indicator tube is marked with a circular altitude scale so that the distance between the reference lobe and the reflection lobe is designated in thousands of feet in altitude.

27. The SCR–718 altimeter transmitting system is adjusted to transmit pulses of the shape shown in figure 5–2A on page 5–9 in section V of the handbook. The pulses transmitted are of approximately .4 microseconds duration or pulse width, and recur at rates of approximately 98 or 9835 pulses per second, depending upon the altitude to be measured.

28. Within a period of six years prior to the filing of plaintiff's petition, altimeter equipment of the type known as SCR–718, and described in above findings 25–27, inclusive, was used by the defendant without the license or consent of the plaintiff.

29. The evidence shows that operation of both the SCR–545 radar apparatus and the SCR–718 altimeter apparatus is wholly dependent upon single pulses being transmitted intermittently and the reflected pulses being received, with means for the measurement of the elapsed time to indicate distance. Neither the SCR–545 radar nor the SCR–718 altimeter transmits a continuous wave or a modulated continuous wave, and neither apparatus includes a modulator for modulating a carrier wave. The main difference between the SCR–545 radar and the SCR–718 altimeter is that the radar uses a single antenna with a transmit-receive device and a rotary spark gap timing device, whereas the altimeter

uses separate transmitting and receiving antennae and uses a crystal-controlled oscillator timing device.

NON-INFRINGEMENT OF CLAIMS

30. Claim 1 of the patent in suit, as set out in finding 11, recites an amplitude modulating member and means for comparing the phase relationship between the modulations of the radiated wave and the received wave, among other items. Neither the SCR–545 radar unit nor the SCR–718 altimeter equipment utilizes an amplitude modulating member or utilizes means for comparing the phase relationships between the modulations. These elements are express limitations in claim 1 as pointed out in findings 17 and 18. Claim 1 in suit is not infringed by either of the two accused structures.

31. Claim 3 of the patent in suit, as set out in finding 11, recites a modulator and an indicating device connected to and receiving energy from both modulator and receiver and indicating distance in terms of energy phase characteristic comparisons of the modulation envelopes, among other items. Neither the SCR–545 radar nor the SCR–718 altimeter utilizes a modulator or utilizes an indicating device receiving energy from a modulator for indicating distance in terms of energy phase characteristic comparisons of modulation envelopes. Claim 3 is not infringed by either of the two accused structures.

32. Claim 4 of the patent in suit, as set out in finding 11, is similar to claim 3, and also recites means for producing a wave length equal to approximately four times the maximum distance to be measured. On this point, the specification of the patent in suit states that the triode 121, shown in the circuit of the patent drawing mentioned in finding 12, is adapted to generate at a frequency corresponding to a wave length of four times the maximum height which it is desired to measure, usually from 1,000 meters to 20,000 meters. There is no evidence that the accused structures include means for producing a wave length of the specific size recited in claim 4. Neither the SCR–545 nor the SCR–718 equipments utilize a modulator or utilize comparison of the phase relationships of modulation envelopes as set forth in claim 4. Claim 4 is not infringed by either of the two accused structures.

33. Considering now claims 5, 6, 7, 8, 9, 16 and 17 of the Hineline patent, at the trial plaintiff did not apply these claims to the accused structures, although he indicated continued reliance on these claims in addition to claims 1, 3 and 4.

34. Claim 5 is generally similar to claim 3, and is more limited in reciting an aerial altimeter structure, in reciting an antennae system for the transmitter, an antennae system for the receiver, an amplifier system including a modulation detector, and a phase relationship measuring device. As set forth in finding 31, neither of the accused structures includes a modulator or utilizes a phase comparison device. Claim 5 is not met in terms by either of the two accused constructions.

35. Claim 6 is similar to claim 5 but recites a phase displacement measuring device in place of a phase relationship measuring device. Neither of the accused structures utilizes a modulator device, a modulation detector, and a phase displacement measuring device. Claim 6 is not met in terms by either of the two accused constructions.

36. Claim 7 is also similar to claim 5 but recites an oscillator device including members for adjusting the wave length to a relatively short wave length between approximately one meter and twenty meters. Neither of the accused structures utilizes a modulator device connected to the specific oscillator device recited in claim 7, or utilizes a phase relationship measuring device. Claim 7 is not met in terms by either of the two accused constructions.

37. Claim 8 is similar to claim 7 but adds that the phase measuring device is connected to the modulator of the radiating system and connected to the detector of the receiving system. Neither of the two accused constructions utilizes a modulator or utilizes a phase displacement measuring device connected to a modulator and to a detector. Claim 8 is not met in terms by either of the accused constructions.

38. Claim 9 is simlar to claims 7 and 8 but adds that the modulator device includes members for adjusting the wave length of the modulator oscillation to a value approximately four times the maximum altitude to be measured. This limitation, also recited in claim 4 and mentioned in finding 32, finds no response in either of the accused constructions which

provide no modulation. Claim 9 is not met in terms by either of the accused constructions.

39. Claim 16 recites an altimeter device subcombination of elements including means for radiating a modulated radio frequency, means for receiving reflected modulated energy, and means for comparing the phase relationship of the modulation of the reflected energy with the phase of the modulation of the radiated energy, said last named means comprising a synchronoscope. The term "synchronoscope" is used in the Hineline patent specification as synonymous with the term "phase-displacement meter." A synchronoscope, or synchroscope, as it is usually designated, is a meter-like instrument which indicates synchronism or lack of synchronism between two sources of alternating current. Such instruments are commonly used for synchronizing the operation of alternating current generators, two or more engines, or similar apparatus to be operated in synchronism. Neither the SCR–545 radar nor the SCR–718 altimeter utilizes modulated radio frequencies, or provides for comparison of the phase relationships of modulated energy from radiated and reflected sources, or utilizes a synchronoscope device. Claim 16 is not met in terms by either of the accused constructions.

40. Claim 17 is generally similar to claim 16 and adds that the synchronoscope is calibrated in units of distance. As stated previously, the accused constructions do not utilize modulated radio frequencies, do not provide for comparison of the phase relationship of modulated energies, and do not include a synchronoscope. Claim 17 is not met in terms by either of the accused equipments.

CONCLUSION OF LAW

Upon the foregoing findings of fact, which are made a part of the judgment herein, the court concludes that as a matter of law the plaintiff is not entitled to recover, and his petition is therefore dismissed.

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